

**WELCOME TO
NASA APPLIED REMOTE SENSING TRAINING
(ARSET)
WEBINAR SERIES**

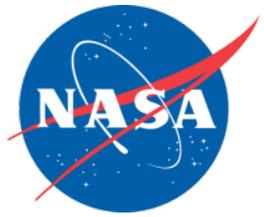
**INTRODUCTION TO REMOTE SENSING FOR
CONSERVATION MANAGEMENT**

COURSE DATES: EVERY TUESDAY, MAY 5 – JUNE 2

TIME: 12:00 – 1:00 PM EDT (GMT-04:00)

OR

10:00 – 11:00 PM EDT



Course Structure

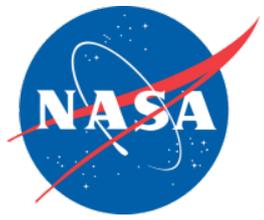
- This is the final week!
 - Every Tuesday May 5 to June 2
 - 12:00 – 1:00 PM EDT (GMT-04:00) (Session 1)
 - 10:00 – 11:00 PM EDT (Session 2)

- Webinar recordings, PowerPoint presentations, and homework assignments can be found after each session at:
<https://arset.gsfc.nasa.gov/ecoforecasting/webinars/introduction-remote-sensing-conservation-management>

- Certificate of Completion
 - Attend 4 out of 5 webinars
 - Assignment 1 and 2 – access from the ARSET Conservation Management webinar website (above)
 - You will receive certificates approximately 1 month after the completion of the course from:
marines.martins@ssaihq.com

- Course survey
 - Will provide link at end of session today and allow for approximately 10 minutes to complete.

- Q/A: email (cynthia.l.schmidt@nasa.gov)



ARSET Conservation Management

The screenshot shows the ARSET (Applied Remote Sensing Training) website. The header includes the NASA logo, the text 'ARSET Applied Remote Sensing Training', and navigation links for 'Earth Science Division', 'Applied Sciences', and 'ASP Water Resources'. A search bar is located in the top right. Below the header is a navigation menu with categories: 'DISASTERS', 'ECO FORECASTING', 'HEALTH & AIR QUALITY', and 'WATER RESOURCES'. The main content area is titled 'Introduction to Remote Sensing for Conservation Management' with dates '05/05/2015 to 06/02/2015'. It lists course dates, objectives, and participants. A sidebar on the left contains links for 'Eco Forecasting', 'Upcoming Training', and 'Disasters'. The footer of the page includes a registration link.

Earth Science Division Applied Sciences ASP Water Resources

NASA ARSET
Applied Remote Sensing Training

Search

DISASTERS ECO FORECASTING HEALTH & AIR QUALITY WATER RESOURCES

Eco Forecasting

- ▶ Eco Webinars
- Eco Personnel

Upcoming Training

Ecoforecasting
Introduction to Remote Sensing for Conservation Management
05/05/2015 to 06/02/2015

Disasters
NASA Remote Sensing Observations for Flood Management
06/08/2015 to 06/29/2015

Introduction to Remote Sensing for Conservation Management

05/05/2015 to 06/02/2015

Course Dates:

- Five 1-hour sessions, each session will be held two times a day to allow for national and international participation from different times zones.
- Each Tuesday from May 5 - June 2 at 12:00-1:00pm and at 10:00-11:00pm (GMT-04:00) Eastern Time (US and Canada)
- Please only sign up for and attend one of the session times.

Course Objectives:

- Provide an overview of remote sensing, details on how to access and visualize relevant NASA Earth science data, and how to use these data for conservation and biodiversity issues.
- Assist NGOs and land management professionals in decision-making through the use of NASA data, relevant tools, and assessment methods.

Course Participants:

- This course is intended for national and international NGOs and land managers at the local, state, and federal level, focused on conservation and biodiversity issues. **Space is limited. Preference will be given to the organization types listed above.**

Course Agenda:

Week 1 (May 5): Overview of remote sensing and conservation applications

Week 2 (May 12): Satellite sensors and aircraft platforms and access tools

Week 3 (May 19): Habitat monitoring

Week 4 (May 26): Animal movement

Week 5 (June 2): Near-real time monitoring

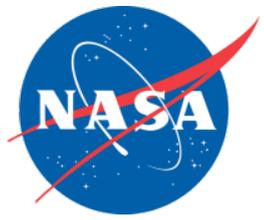
All training materials will be available in English and Spanish.

Certificates will be provided for those who attend 4 out of 5 weeks (of the same session time) and complete all homework assignments.

Register for one of the session times below:

[Click here to register for the 12:00-1:00pm \(EDT\) session](#)

<https://arset.gsfc.nasa.gov/ecoforecasting/webinars/introduction-remote-sensing-conservation-management>



Accessing the Recordings

ADOBE® CONNECT™ 🕒 TimeZone (US/Pacific-New) ▼

ARSET
Applied Remote Sensing Training 



Event Info | **Event Registration**

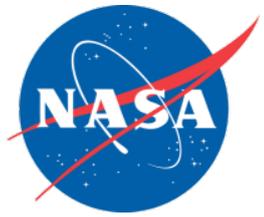
RS for Conservation Management Week 2 Recording
In case you have not registered for this event before [please click here to register](#)

Login using Email

E-mail Address:



You must register to access the recordings!
This is different from your webinar registration.



Your Course Instructors

- ❑ Cindy Schmidt (ARSET): cynthia.l.schmidt@nasa.gov
- ❑ Amber Kuss (ARSET): amberjean.m.kuss@nasa.gov
- ❑ Guest Speakers:
 - ❑ Walter Jetz – Yale University (week 3)
 - ❑ Jeff Cavner – University of Kansas (week 4)
 - ❑ Karyn Tabor – Conservation International (week 5)

General inquiries about ARSET: Ana Prados (ARSET)
aprados@umbc.edu

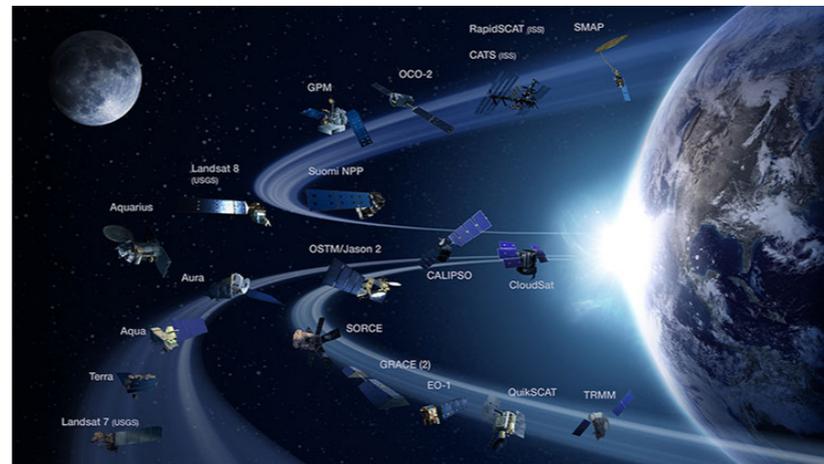
Course Outline

Week 1



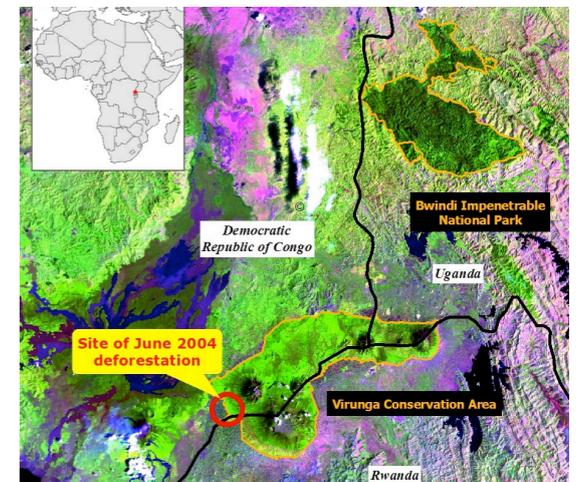
Overview of satellite remote sensing

Week 2



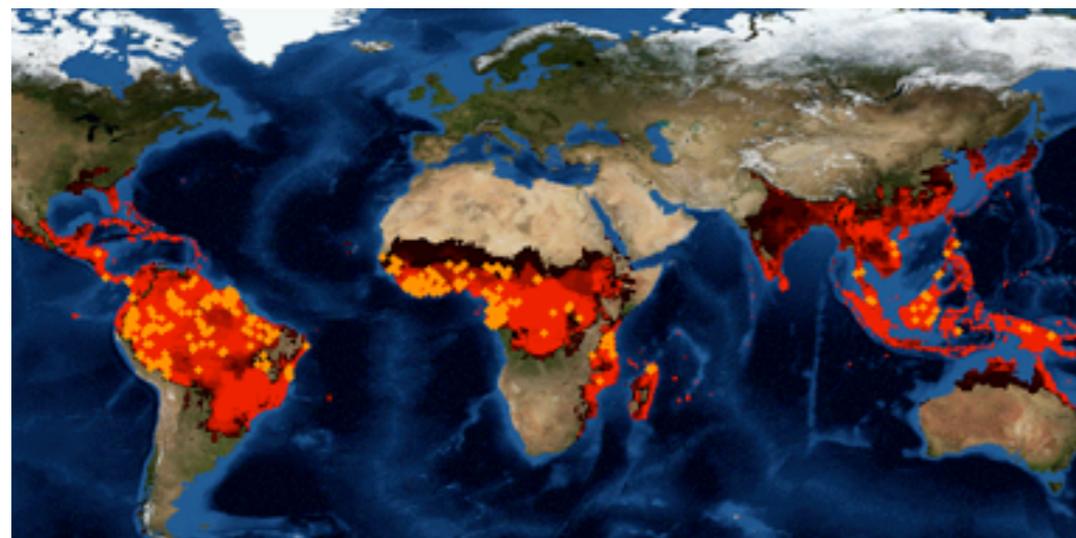
Platforms and sensors for conservation

Week 3



Habitat monitoring

Week 4

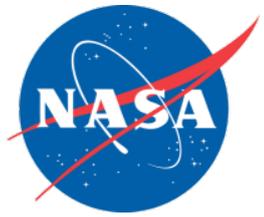


Animal movement

Week 5

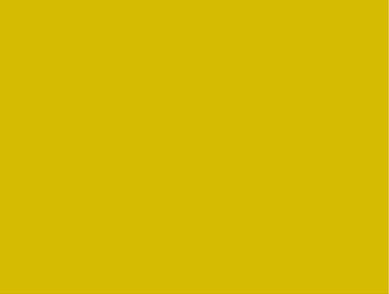


Near-real time data



Week 5 Agenda

- Review of Week 4
- Guest Speaker: Karyn Tabor, Director of Ecosystem Modeling and Early Warning Systems at Conservation International
 - Overview of near real-time (NRT) monitoring
 - Overview of satellite sources of NRT monitoring
 - How NRT monitoring is used in conservation
 - Governments
 - Communities
 - Conservation organizations
 - Examples of uses in forest systems
 - Live demo
 - Firecast
 - Survey information and link



Review of Week 4

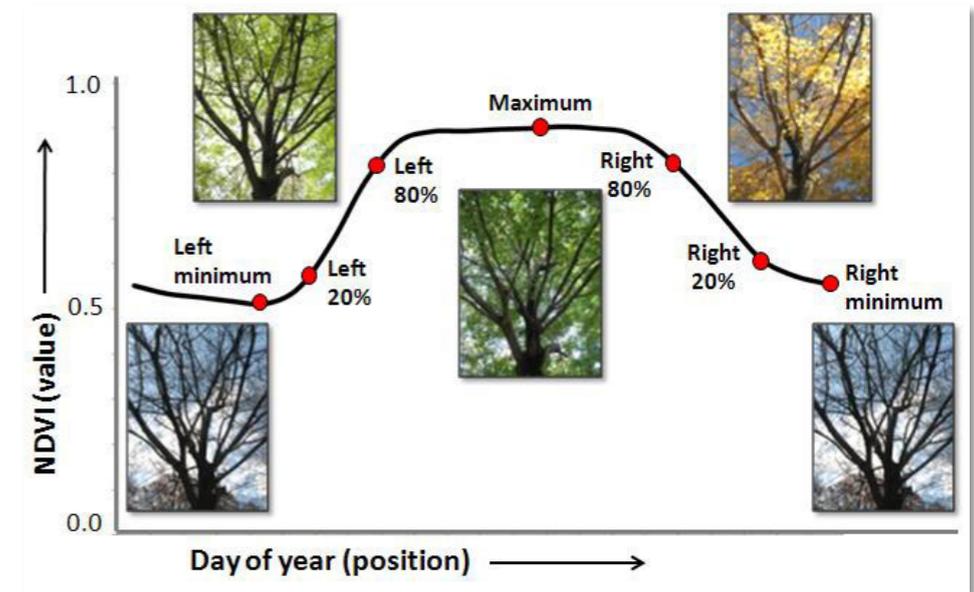


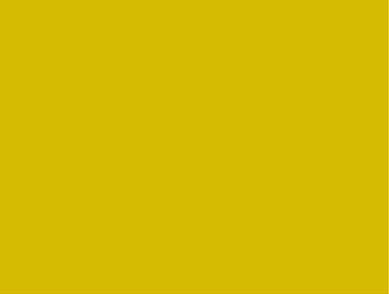
Remote Sensing and Animal Movement

- Remote sensing can capture characteristics about the environment at different scales
 - Animal locational data are combined with remote sensing data
 - Determine why and when animals move
- Uses of vegetation indices (NDVI and EVI) to track phenology
- Movebank
 - Online database of animal tracking data
- Live demo
 - Lifemapper: Jeff Cavner, University of Kansas



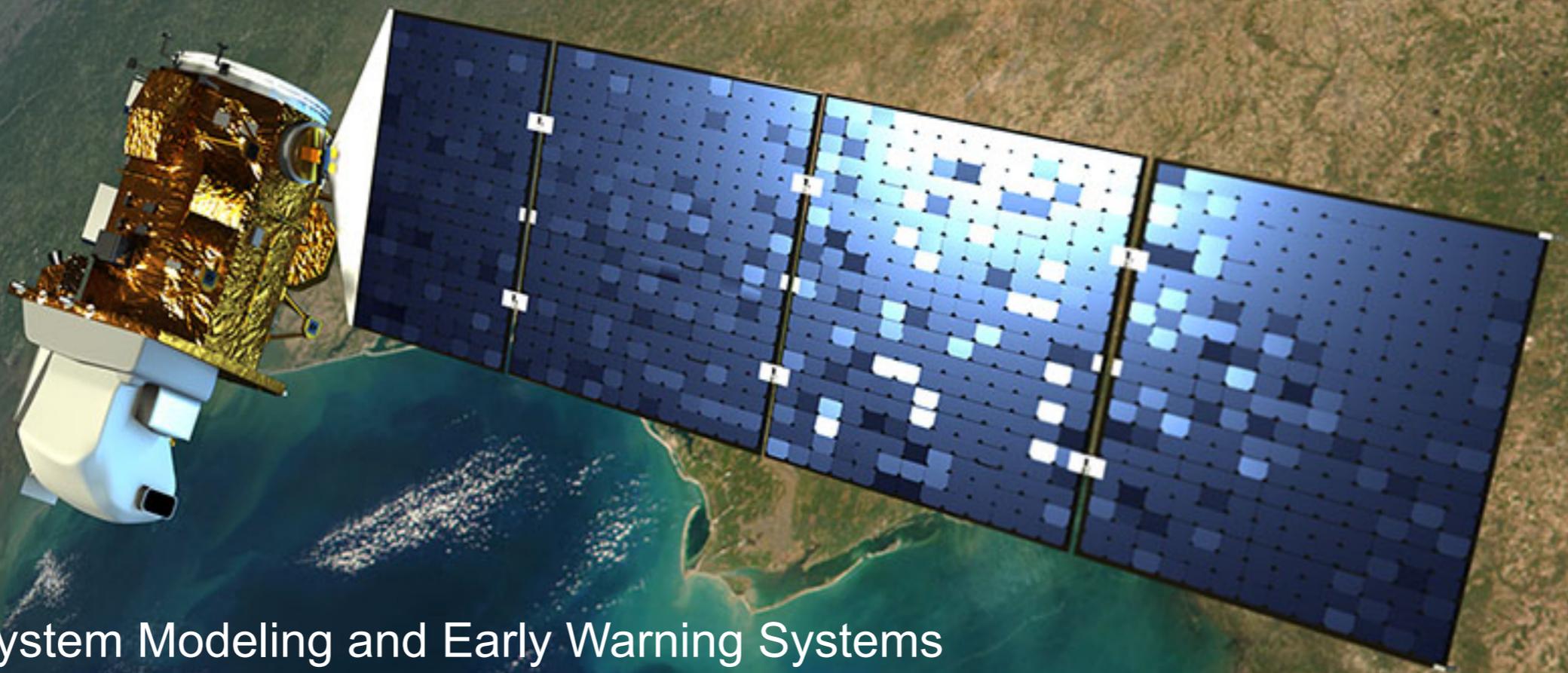
Wildebeest migration, Image credit: tanzaniaonlinefoot.com (left) Elizabeth Gordon (right).





Guest Speaker: Karyn Tabor

Near real-time monitoring for conservation management



Karyn Tabor

Director of Ecosystem Modeling and Early Warning Systems

Betty and Gordon Moore Center for Science and Oceans

Conservation International

Arlington, VA USA

ktabor@conservation.org

An aerial photograph showing a vast, dense forest with a uniform green canopy. The trees are packed closely together, creating a textured, mosaic-like pattern of green. The lighting is bright, highlighting the vibrant color of the foliage.

Objective

To learn how to use near real-time monitoring and alert systems to track and extinguish emerging threats to forests, natural resources, and communities.



Outline

1. What is Near Real-Time (NRT) monitoring
2. Review of NRT satellite-derived sources
3. How NRT monitoring is used for conservation
4. Examples of NRT forest monitoring systems
5. Choosing the right NRT monitoring system
6. Demonstration of Firecast

An aerial photograph showing a vast, dense forest with a uniform green canopy. The trees are packed closely together, creating a textured, mosaic-like pattern of green. The lighting is bright, highlighting the vibrant color of the foliage.

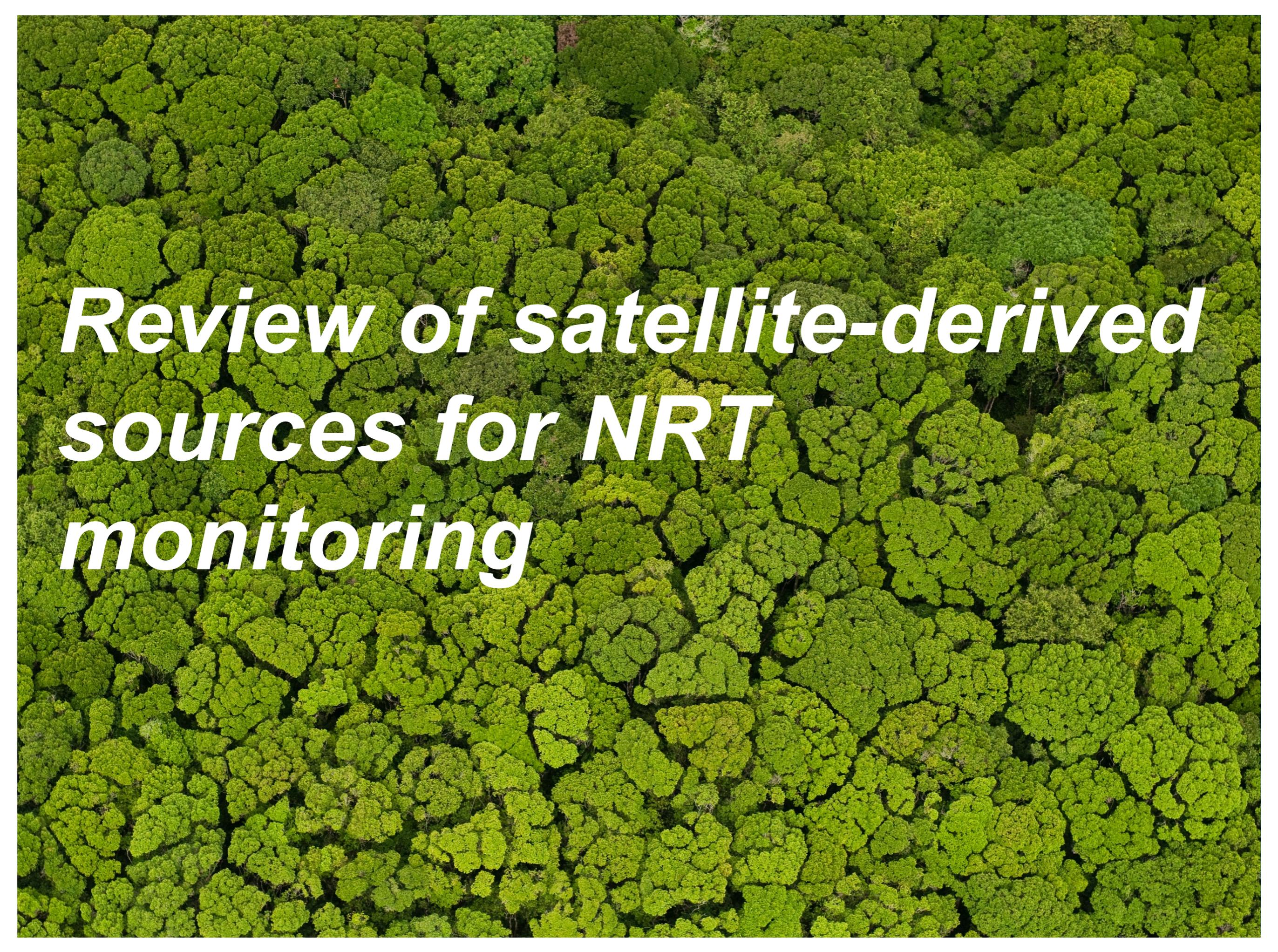
**What is near real-time
monitoring?**



“Real-Time” = tracking status and changes as they happen

“Near Real-Time” = lag between observation and delivery of the information for decisions

Monitoring can be from satellite, drones, mobile devices, cameras, sound recorders

An aerial photograph showing a vast, dense forest with a uniform green canopy. The trees are packed closely together, creating a textured, mosaic-like appearance from above. The lighting is bright, highlighting the vibrant green of the foliage.

***Review of satellite-derived
sources for NRT
monitoring***

An aerial photograph of a rural landscape, possibly a farm or agricultural area, showing a grid overlay that represents NRT data. The grid is composed of small, light-colored squares, likely representing individual data points or pixels. The landscape features a mix of green fields, brown patches, and some structures.

Use of NRT data for effective conservation require...

- **Data access**
- **Appropriate spatial resolution**
- **Delivery time**
- **Precision**

Example sources of NRT data

Polar orbiting – Landsat, MODIS, CBERS, VIIRS, AVHRR

Daily to 2 week repeat, higher resolution

Low inclination orbit - merged optical and radar

TRMM and GPM missions

3-hourly

Geosynchronous- GOES

Continuous monitoring, low resolution



An aerial photograph showing a vast, dense forest with a uniform green canopy. The trees are packed closely together, creating a textured, mosaic-like pattern of green. The lighting is bright, highlighting the vibrant color of the foliage.

**How near real-time
monitoring is used for
conservation**



National and Local Governments

- Transparency
- Responding to threats
- Active fire control
- Support enforcement activities
- Strategize patrols and deter illegal activities
- Collect fines
- Reducing Emissions from Deforestation and forest Degradation (REDD+)
- National adaptation plans
- Sustainable development

Use case: National and Local Governments

Autoridad de fiscalización y control social de Bosque y Tierras (ABT) - Bolivia

- Uses MODIS and VIIRS active fire and burn scar data to enforce land use policies
- Monitor and investigate illegal burning
- Fine land owners

El **Gráfico 3** permite visualizar la evolución de la magnitud de focos de calor mensual y acumulada durante la gestión 2014.

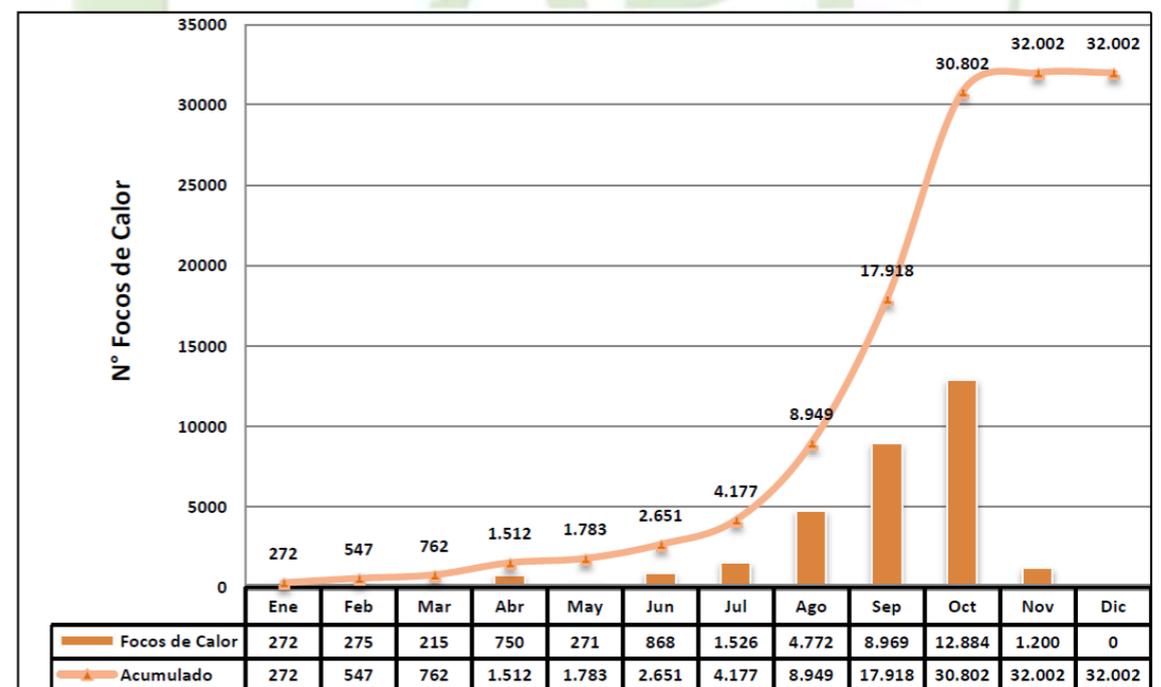


Gráfico 3. Registro mensual de focos de calor en territorio nacional. Gestión 2014.
Incluye datos del día 13/11/2014 descargados hasta 06:30 am.



Communities

- Manage natural resources
- Community action and empowerment
- Community-based monitoring
- Respond to threats to property (buildings, livestock)

Use case: Communities

Baly Bay, Madagascar

- Fire is a serious threat to the native habitat
- Angonoka tortoise is one of world's most endangered tortoises
- Friendly village competition using CI's fire alerts
- Cash prize used for development projects
 - Improve school buildings
 - Build wells for clean water
 - Purchase solar panels



Angonoka tortoise



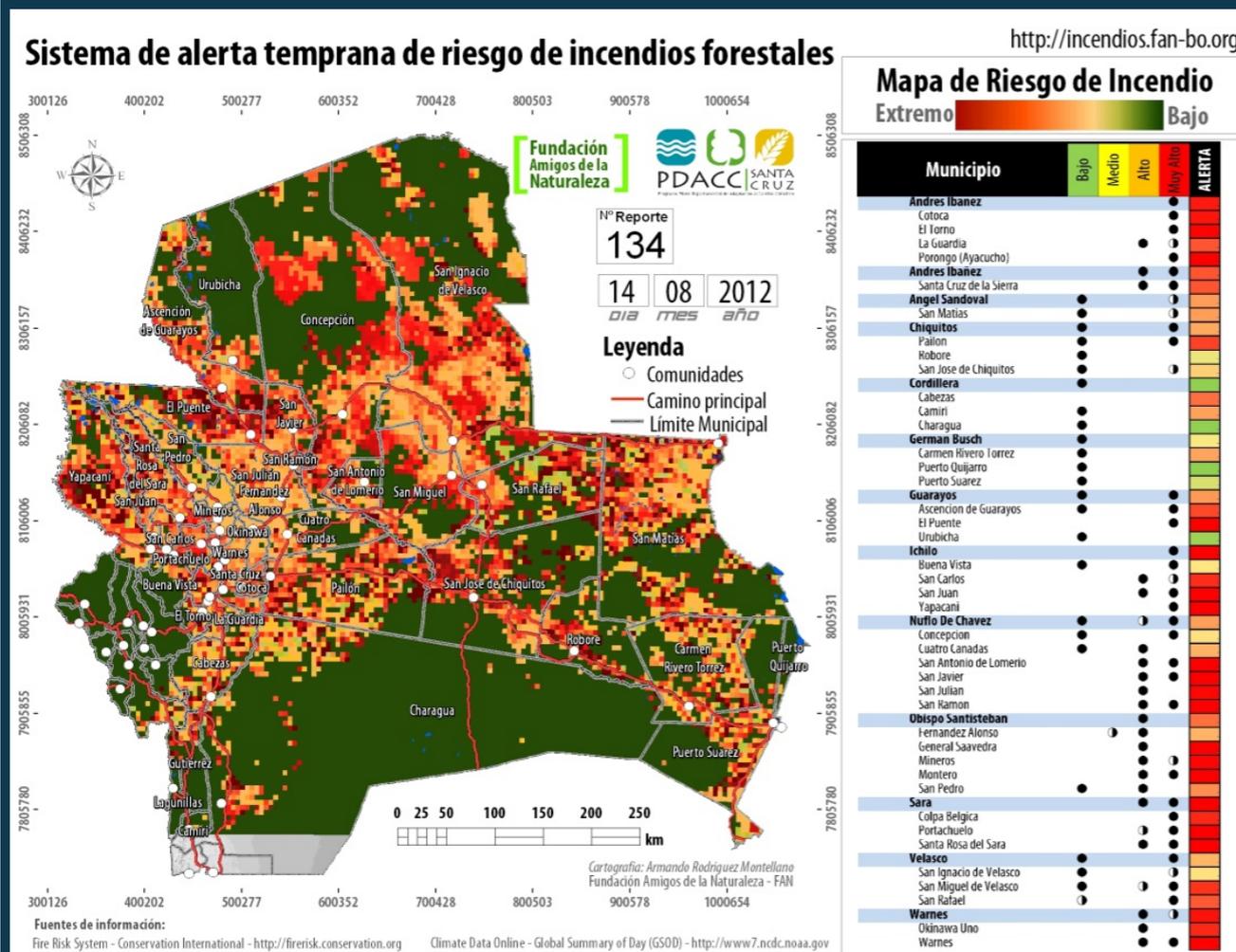
Conservation Organizations

- Prioritization of investments
- Education and awareness
- Disseminate data
- Promote systems for policy decisions
- Capacity building

Use Case: Conservation Organizations

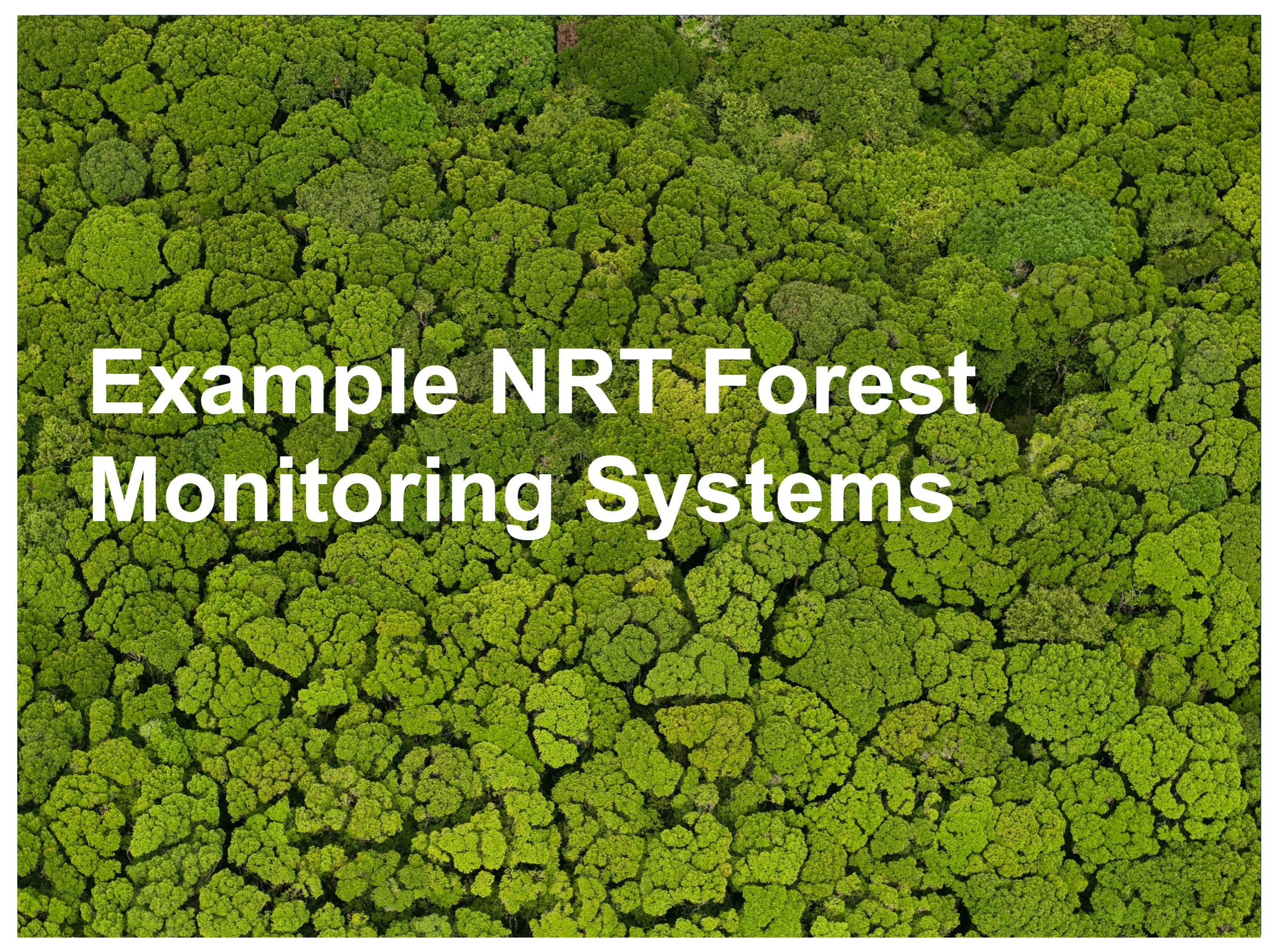
Fundación Amigos de la Naturaleza (FAN), Bolivia

FAN sends alerts and provides outreach and education to warn farming communities of dangerous fire conditions



SATRIF- FAN adds wind speed (spread) and density of historical fires (for increased risk of fire) to enhance the model with local information

FAN engages 34 indigenous and 4 Mennonite communities in Santa Cruz, Bolivia (~10,000 people)

An aerial photograph of a dense forest, showing a vast expanse of green tree canopies. The trees are packed closely together, creating a textured, mosaic-like pattern of green. The lighting is bright, highlighting the vibrant green of the foliage. The text is overlaid in the center of the image.

Example NRT Forest Monitoring Systems

Fire Information for Resource Management System (FIRMS / GFIMS)

Data & resolution: daily active fire (1-km), monthly burned area (500-m)

Data Source: MODIS

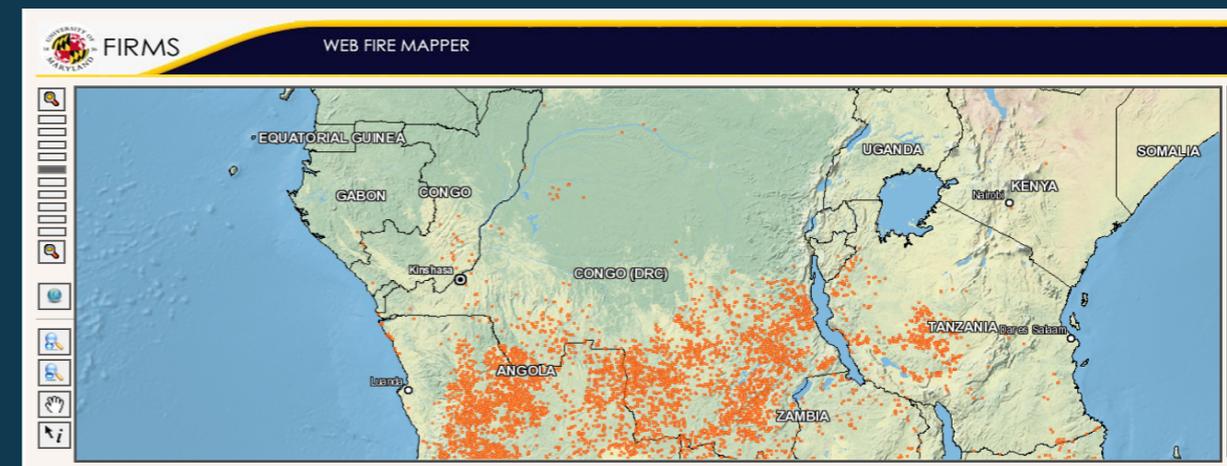
Geographic Coverage: global

Focus: protected areas

Information delivery: email alerts, web map, website download

Target User: researchers, data distributors, protected area managers, national and local governments

Organization: NASA/Food & Agriculture Organization (FAO)



FIRMS: earthdata.nasa.gov/data/near-real-time-data/firms



GFIMS: <http://www.fao.org/nr/gfims/gf-home/en/>

Advanced Fire Information System (AFIS)

Data & resolution: daily active fire (1-km, 750-m, 375-m), monthly burned area (500-m), fire risk, fire danger

Data Source: MODIS, VIIRS, MSG-GOES

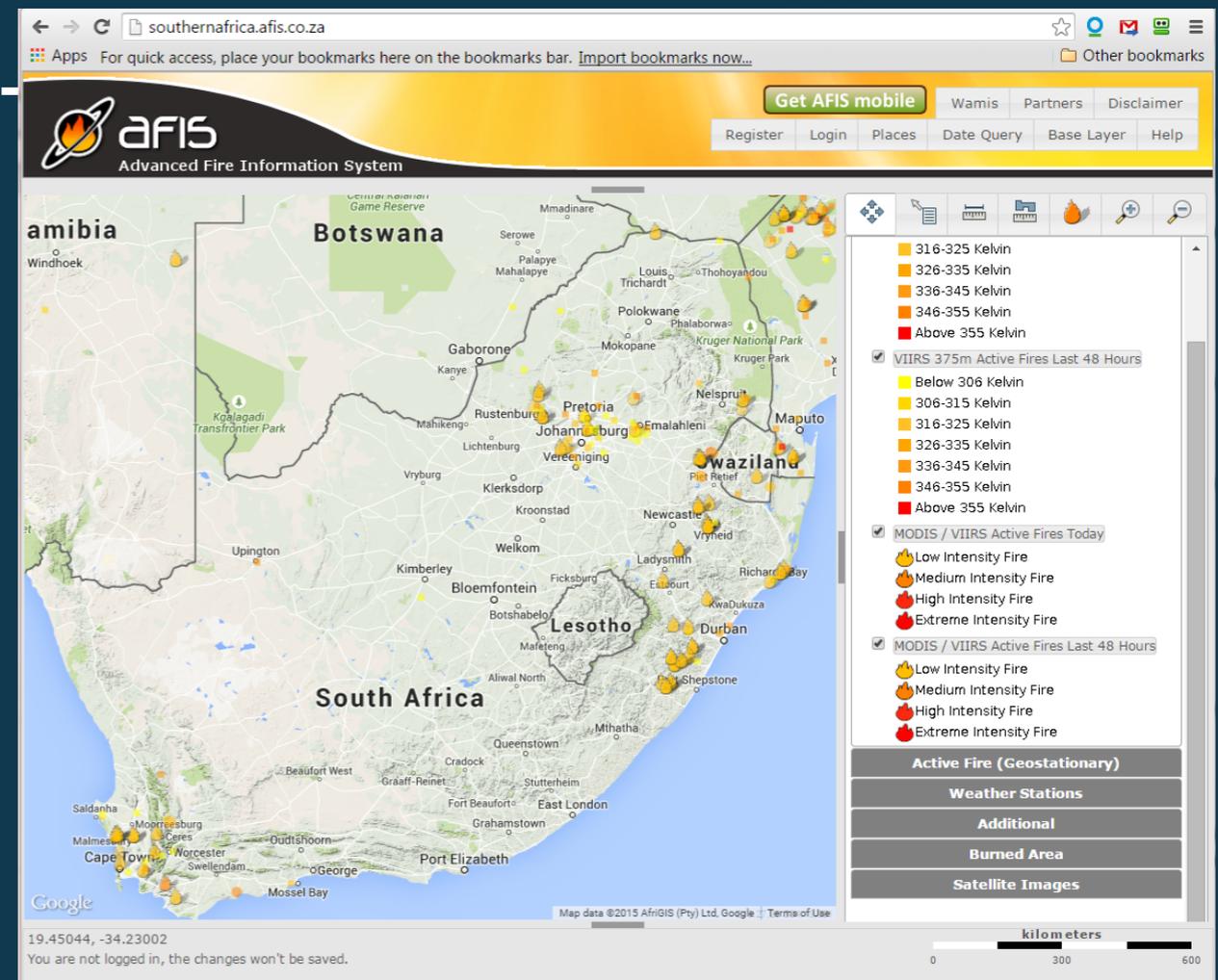
Geographic Coverage: global

Focus: Fire Management

Information delivery: email alerts, web map, mobile app

Target User: national and local governments, forest and fire service, general public

Organization: Council for Scientific and Industrial Research (CSIR)



<http://southernafrica.afis.co.za/>

DETER, PROARCO, and PRODES

Data & resolution: daily active fire (1-km, 5-km), monthly burned area (500-m), 250-m deforestation, 30-m deforestation

Data Source: MODIS, AVHRR, GOES, Landsat, CBERS

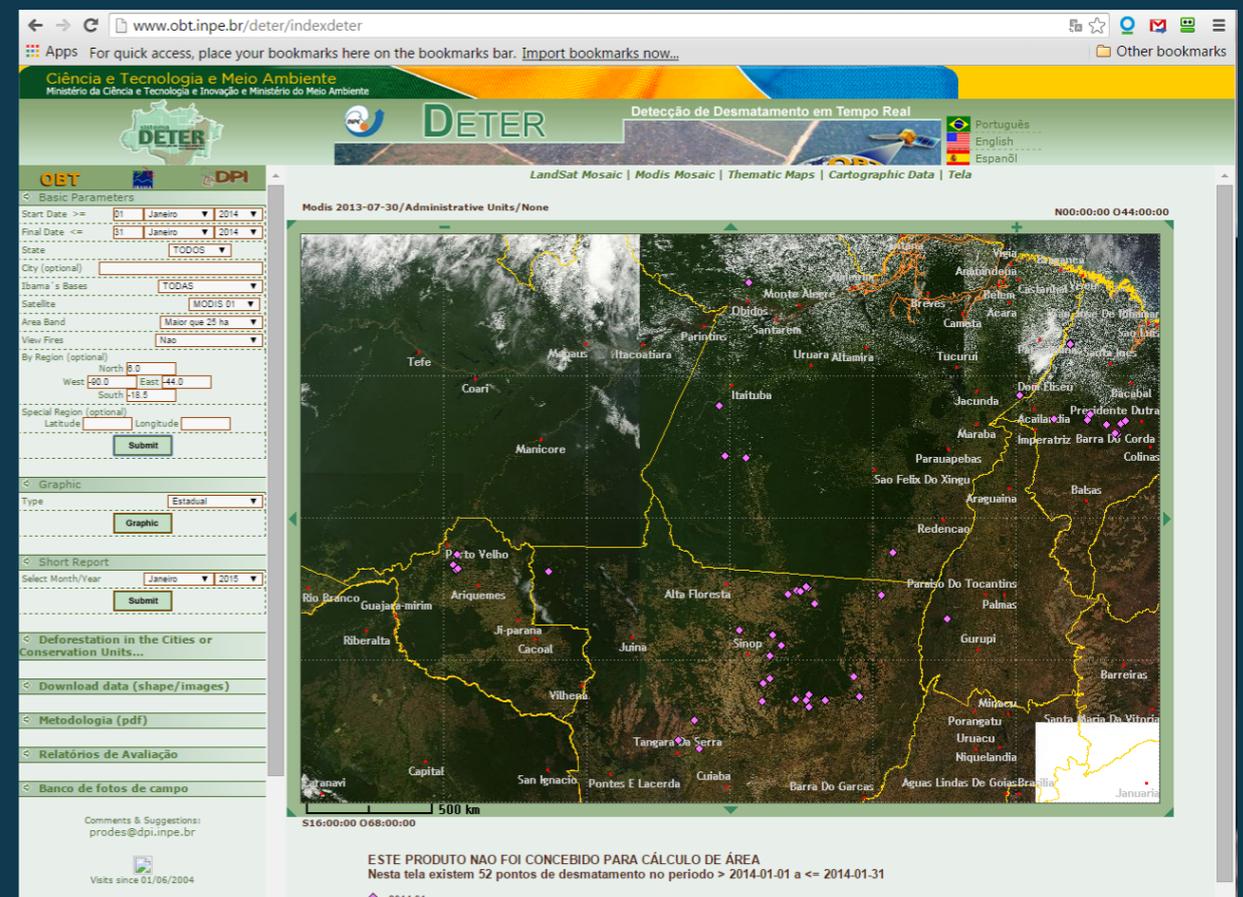
Geographic Coverage: Brazilian Amazon

Focus: protected areas, political units

Information delivery: email alerts, web map

Target User: researchers, national and local governments

Organization: National Institute for Space Research (INPE)



<http://www.obt.inpe.br/deter/indexdeter>

<http://www.dpi.inpe.br/proarco/bdqueimadas/>

<http://www.obt.inpe.br/prodes>

SAD (Sistema de Alertas de Desmatamento) & ImazonGEO

Data & resolution: monthly 250-m deforestation and degradation (NDFI), annual deforestation daily active fires (1-km)

Data Source: MODIS

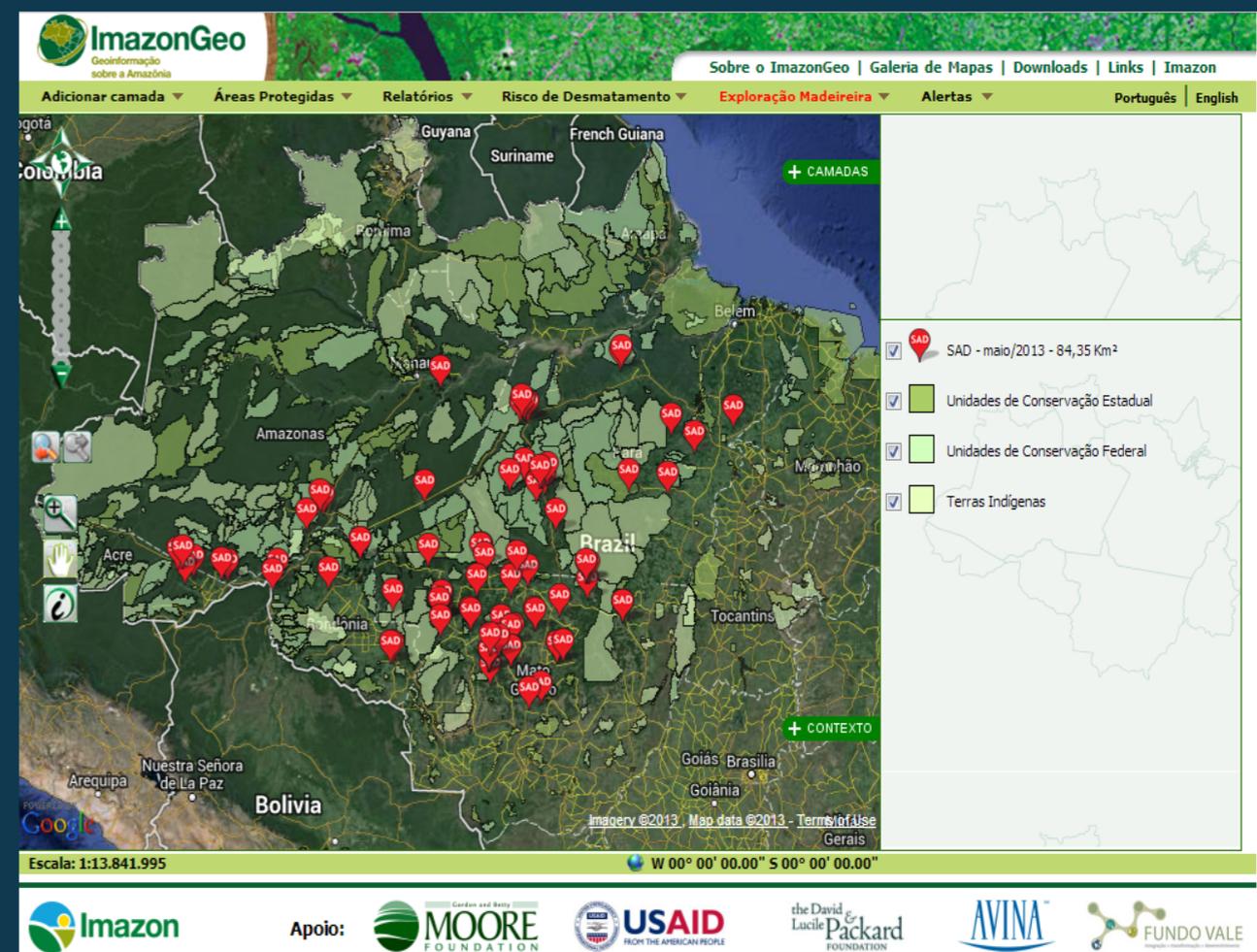
Geographic Coverage: Brazilian Amazon

Focus: protected areas, forest concessions, political units

Information delivery: email alerts, mobile alerts, downloadable reports, web map

Target User: protected area managers, national and local governments

Organization: IMAZON



<http://www.imazongeo.org.br>

<http://www.imazon.org.br/publications/forest-transparency>

Global Forest Disturbance Alert System (GloF-DAS) / Quarterly Indicator of Cover Change (QUICC)

Data & resolution: quarterly disturbance (5-km)

Data Source: MODIS

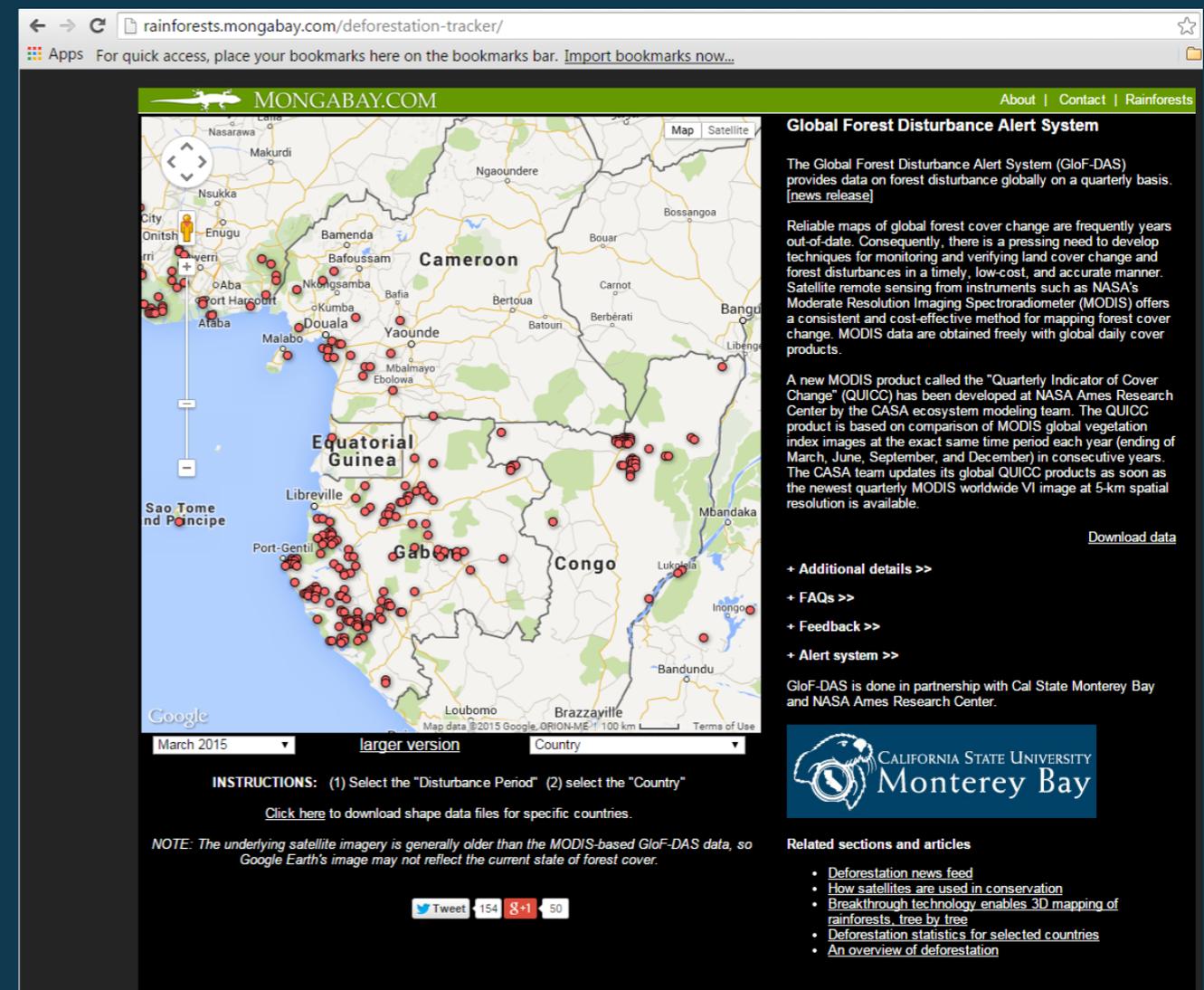
Geographic Coverage: Global

Focus: political units

Information delivery: web map, summary reports

Target User: researchers, data distributors, national and local governments

Organization: NASA Ames/
California State University
Monterey Bay



The screenshot displays the web interface for the Global Forest Disturbance Alert System (GloF-DAS). The main content area features a map of West Africa, showing forest disturbance locations marked with red dots. The map is titled 'MONGABAY.COM' and includes a navigation menu with 'About', 'Contact', and 'Rainforests' links. Below the map, there are instructions for using the system, a note about the data source, and a list of related sections and articles. The interface is designed to provide users with a clear overview of forest disturbance data and resources for further exploration.

Global Forest Disturbance Alert System

The Global Forest Disturbance Alert System (GloF-DAS) provides data on forest disturbance globally on a quarterly basis. [\[news release\]](#)

Reliable maps of global forest cover change are frequently years out-of-date. Consequently, there is a pressing need to develop techniques for monitoring and verifying land cover change and forest disturbances in a timely, low-cost, and accurate manner. Satellite remote sensing from instruments such as NASA's Moderate Resolution Imaging Spectroradiometer (MODIS) offers a consistent and cost-effective method for mapping forest cover change. MODIS data are obtained freely with global daily cover products.

A new MODIS product called the "Quarterly Indicator of Cover Change" (QUICC) has been developed at NASA Ames Research Center by the CASA ecosystem modeling team. The QUICC product is based on comparison of MODIS global vegetation index images at the exact same time period each year (ending of March, June, September, and December) in consecutive years. The CASA team updates its global QUICC products as soon as the newest quarterly MODIS worldwide VI image at 5-km spatial resolution is available.

[Download data](#)

+ Additional details >>
+ FAQs >>
+ Feedback >>
+ Alert system >>

GloF-DAS is done in partnership with Cal State Monterey Bay and NASA Ames Research Center.

CALIFORNIA STATE UNIVERSITY Monterey Bay

Related sections and articles

- [Deforestation news feed](#)
- [How satellites are used in conservation](#)
- [Breakthrough technology enables 3D mapping of rainforests, tree by tree](#)
- [Deforestation statistics for selected countries](#)
- [An overview of deforestation](#)

<http://rainforests.mongabay.com/deforestation-tracker/>

Center for International Forestry Research (CIFOR) Fire Tool

Data & resolution: daily active fire (1-km), quarterly burned area (500-m)

Data Source: MODIS, Landsat

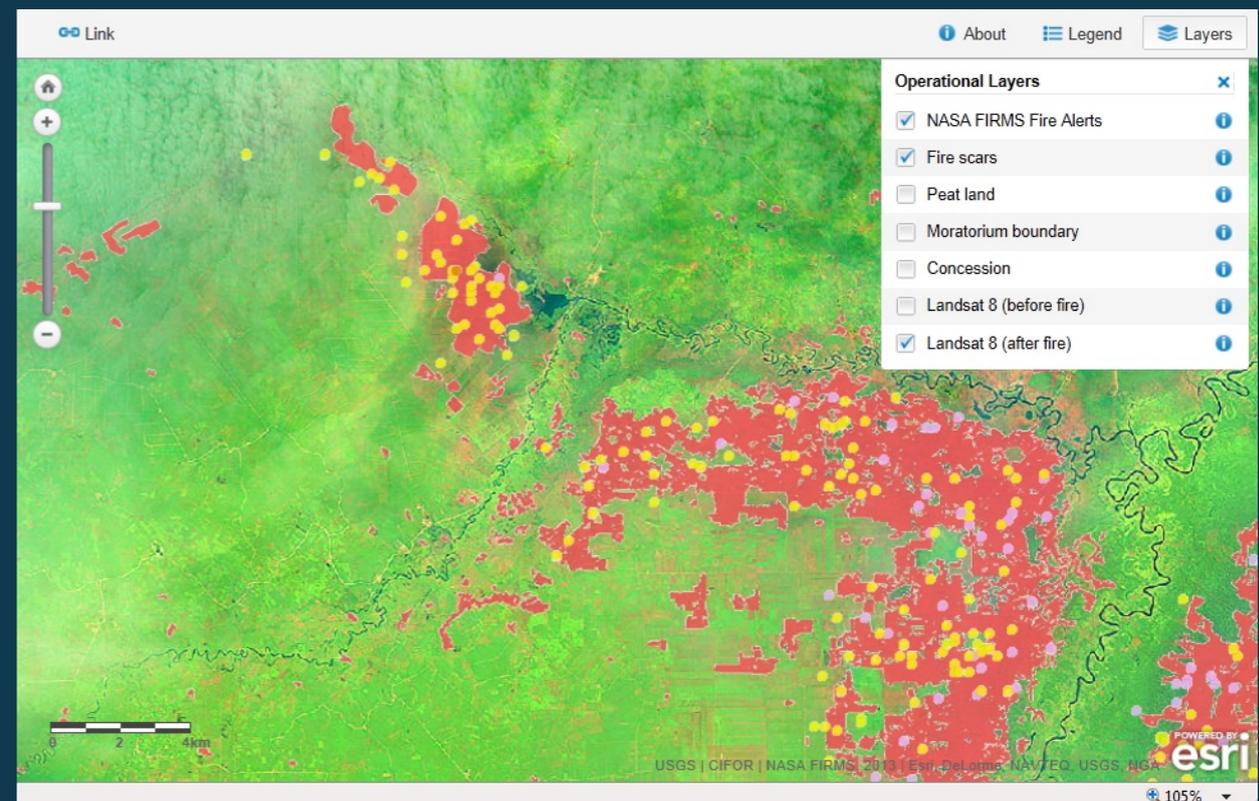
Geographic Coverage: Indonesia

Focus: peatlands, logging concessions

Information delivery: web map

Target User: researchers, data distributors, GIS technicians, protected area managers, national and local governments

Organization: CIFOR



<http://www.cifor.org/map/fire/>

Terra-i

Data & resolution: bi-monthly, semi-annual, annual, habitat change (250-m)

Data Source: MODIS, Landsat

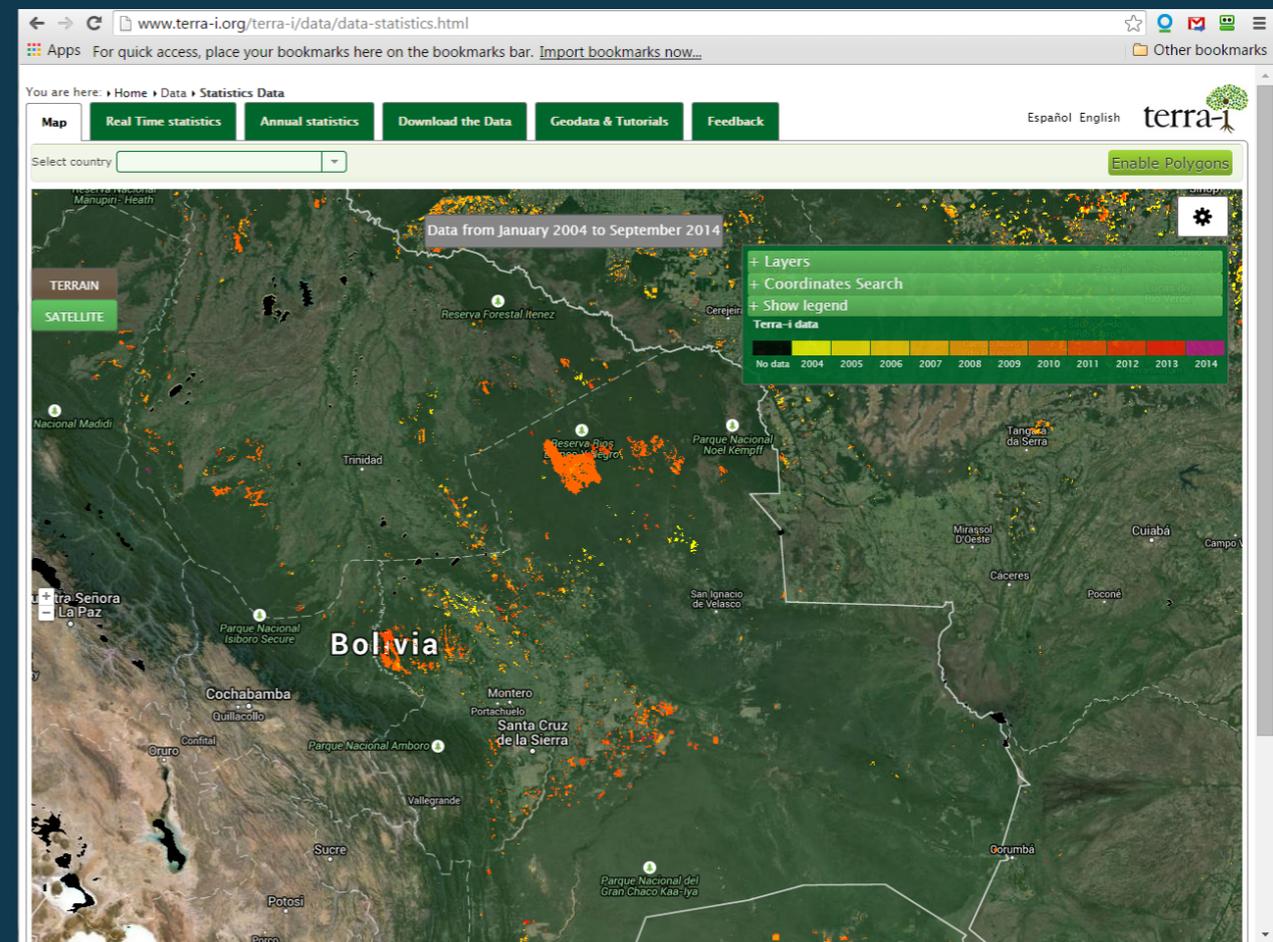
Geographic Coverage: South America

Focus: ecoregion, protected areas, indigenous areas, political units

Information delivery: summary report, web map

Target User: researchers, data distributors, GIS technicians, protected area managers, national and local governments

Organization: International Center for Tropical Agriculture (CIAT-DAPA), The program for Forestry, Trees and Agroforestry (FTA), The Nature Conservancy (TNC), School of Business and Engineering (HEIG-VD), King's College London (KCL)



<http://www.terra-i.org>

Firecast

Data & resolution: daily active fire (1-km, 375-m coming soon), daily fire risk (5-km), annual fire season severity forecasts (national-level)

Data Source: MODIS, VIIRS, TRMM

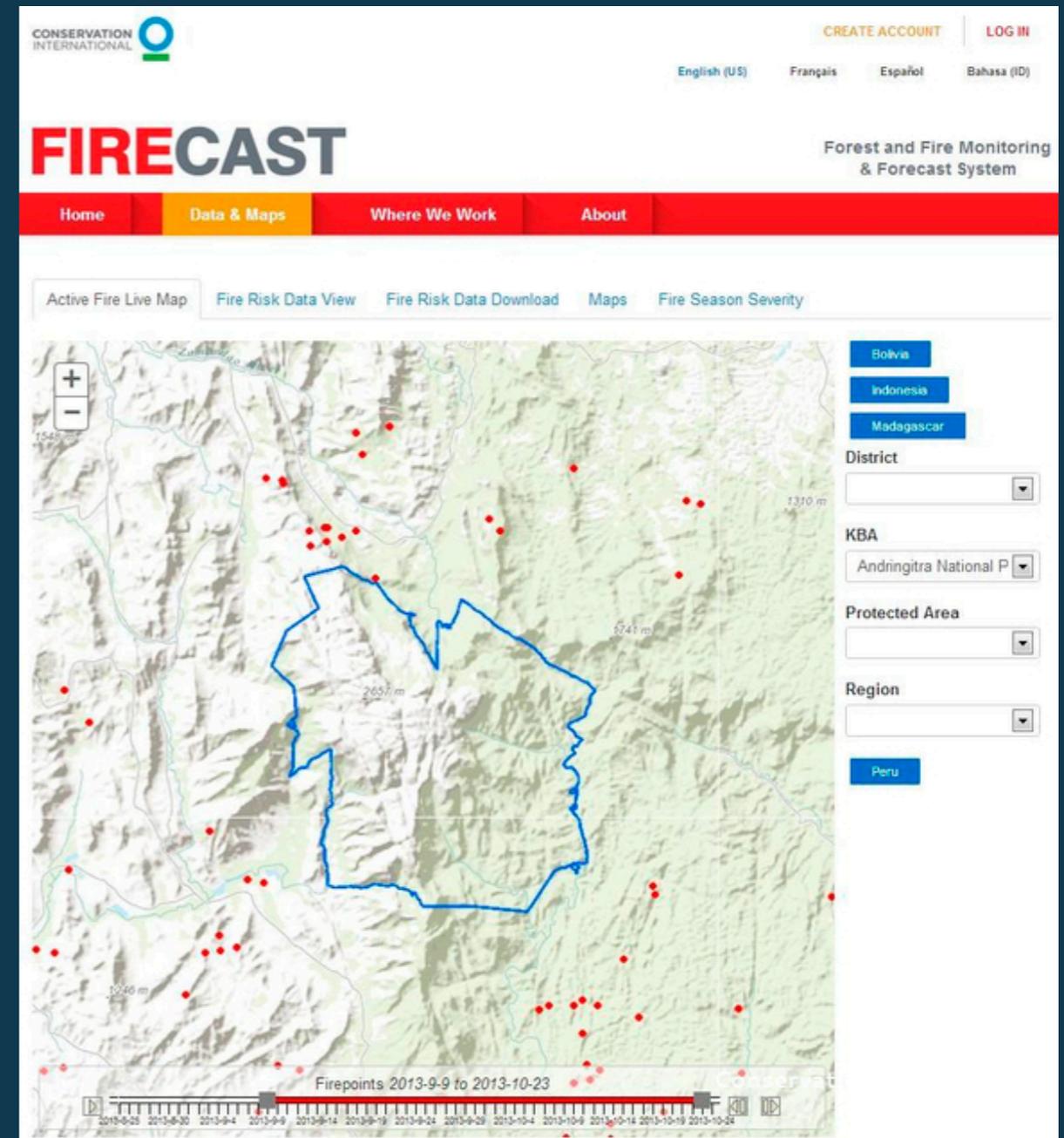
Geographic Coverage: Colombia, Peru, Bolivia, Madagascar, Indonesia

Focus: biodiversity, indigenous areas, political units, forestry units

Information delivery: email alerts, web map, mobile app coming soon

Target User: protected area managers, government and NGO

Organization: Conservation International



<http://firecast.conservation.org>

Global Forest Watch/ Global Fires

Data & resolution: daily 1-km active fires, annual 30-m forest cover gain and loss; 5-km QUICC quarterly disturbance; monthly 250-m SAD; monthly 250m terra-I; monthly 500-m tree cover loss (FORMA)

Data Source: MODIS, Landsat, NOAA-18

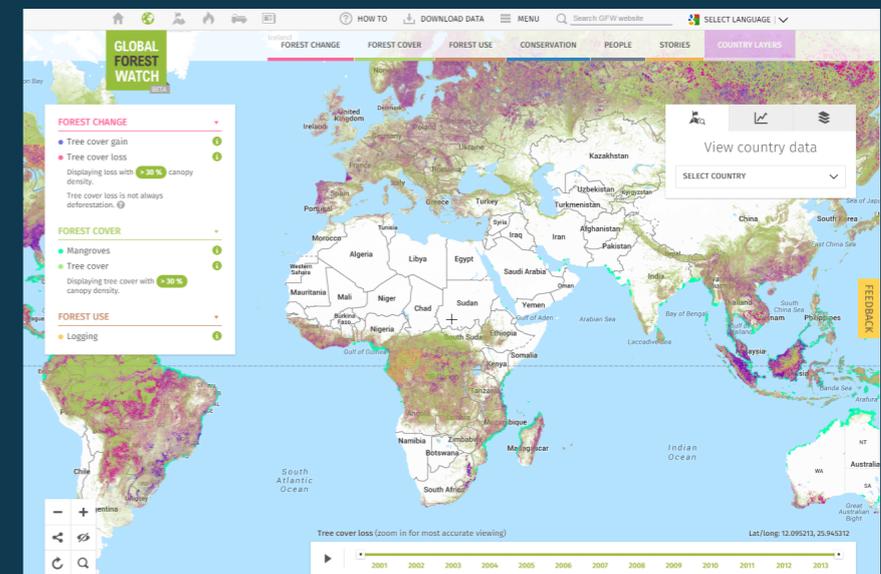
Geographic Coverage: Global

Focus: biodiversity, concessions, infrastructure, indigenous communities

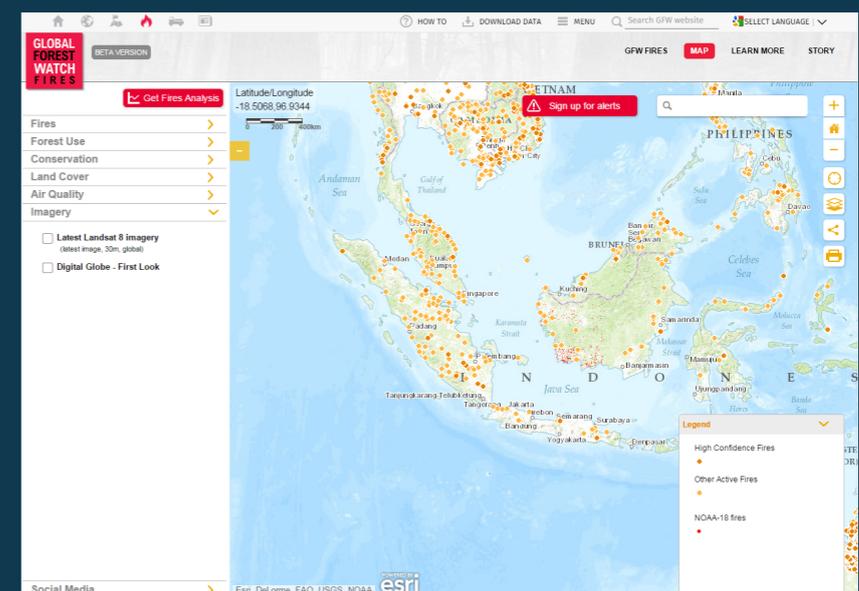
Information delivery: web map, email or SMS alerts, mobile app *coming soon*

Target User: policy makers, civil society, media, public

Organization: World Resources Institute (WRI)



<http://globalforestwatch.org/>



<http://fires.globalforestwatch.org/>

Monitoring of the Andean Amazon (MAAP)

Data & resolution: WRI FORMA, Terra-i deforestation alerts

Data Source: MODIS, Landsat

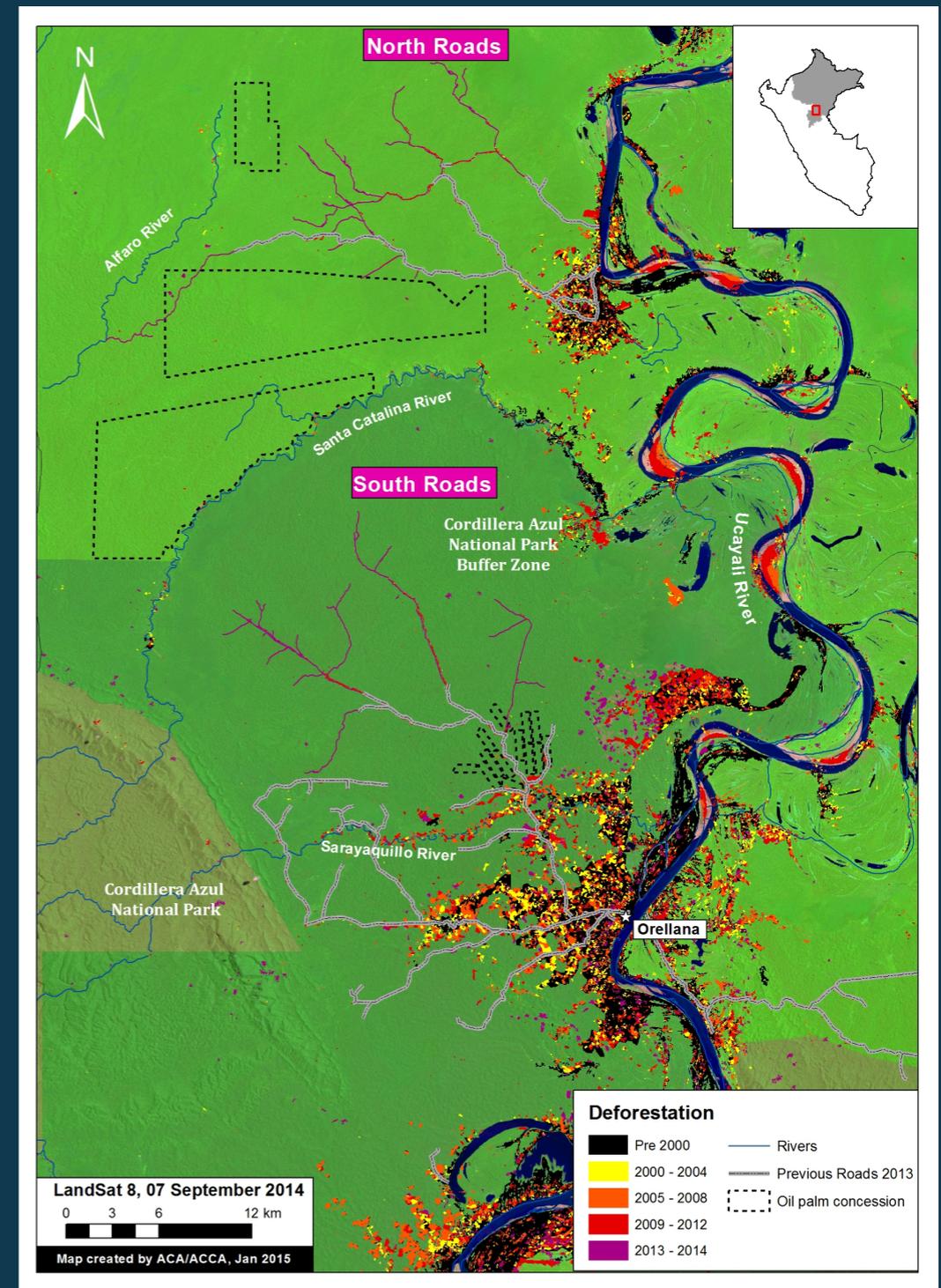
Geographic Coverage: Amazon

Focus: mining, logging, oil palm plantations, hydroelectric dams, oil and gas development, coca cultivation

Information delivery: web portal, “image of the week”

Target User: policy makers, civil society, media, public

Organization: Amazon Conservation Association



<http://maaproject.org/en/>

An aerial photograph of a dense forest, showing a vast expanse of green tree canopies. The trees are packed closely together, creating a textured, mosaic-like pattern of various shades of green. The perspective is from directly above, looking down on the forest floor.

Choosing the right system



There is no one system that will fit all solutions

1. Geography
2. Response Time
3. Data format
4. Information Delivery
5. Automatic/manual



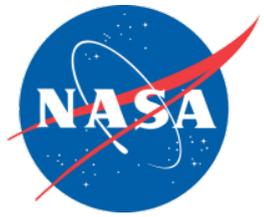
Where to get more information on NRT monitoring

Musinsky, J. “Near Real-Time Monitoring and Alert Systems.” *REDD+ Measurement, Reporting and Verification (MRV) Manual, Version 2.0*. Eds. J. Hewson et al. USAID-supported Forest Carbon, Markets, and Communities Program, 2014. Washington, DC, USA.

http://www.fcmcglobal.org/documents/mrvmanual/MRV_Manual_Chapter7.pdf

An aerial photograph of a dense forest, showing a vast expanse of vibrant green tree canopies. The trees are packed closely together, creating a textured, mosaic-like pattern of green. The lighting is bright, highlighting the rich green color of the foliage. The text "Demonstration of Firecast" is overlaid in white, bold, sans-serif font across the center of the image.

Demonstration of Firecast



Final Reminders/Survey

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 - ❑ You will receive certificates approximately 1 month after the completion of the course from: marines.martins@ssaihq.com
- ❑ Conservation Webinar Survey

Baobab
Trees,
Madagascar.
Image
credit:
Cristina
Mittermeier



Thank You!!

Cindy Schmidt

Cynthia.L.Schmidt@nasa.gov